

## REPORT ON

### ***RESPBERRY PI WITH ARM11 cortex A series WORKSHOP***

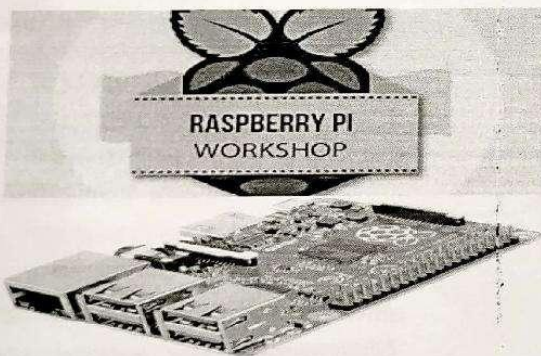
A Raspberry Pi workshop was conducted by ELECTRONICS AND COMMUNICATION ENGINEERING at NALLA NARASHIMHA REDDY GROUP OF INSTITUTIONS ,HYDERABAD on the 1st to 5th of june 2018. The workshop included a demo of some of the capabilities of the Raspberry Pi as well as a hands-on session on using Python/Flask to build a small web app and access the Rpi I/O through a browser based interface. A small group of enthusiastic students and professionals attended the workshop.

Faculty Coordinated by : 1. Mr.S.SRINIVASARAO ASSO PROF ,2.Ms SNEHA TALARI ASST PROF,3.Ms SK SHAFIA ASST PROF, 4. Mr. A.SRINIVAS KASHYAP LAB TECHNICAL INCHARGE

***organized and conducted a practical workshop on***

***" RESPBERRY PI WITH ARM11 cortex A series"***

***(in fully practical way with the learning by doing hands on projects)***



#### **OVERVIEW:**

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.

#### **DESCRIPTION :**

Welcome to the **Raspberry Pi Workshop!** Here you'll be able to follow along with our series that covers everything you'll need to know to get started with your Raspberry Pi and start making awesome projects. As we progress through the workshops, you'll find helpful material -these could be code snippets, commands to issue, circuits to build, or links to other resources.

Our workshop will introduce you to the unexplored potential of the Raspberry Pi-the hardware, software and its applications. The Workshop is designed to cater to all kinds .

### Workshop Content:

1. Introduction to Engineering fields and career opportunity.
2. Introduction to basic electronic components with practical testing.
3. Theoretical aspect of Temperature alarm, light detector, smoke detector and other projects proposed by participated student.
4. Introduction to KIEL ,PROTEUS,WELLON PROGRAMER,ARDINO,RESPBIAN.
5. Circuit design for these projects and testing the same.
6. Project fabrication, testing and troubleshooting .
7. Improvements real-life applications and future development of the deigned project.

#### Day 1 (Session 1)

##### Introduction to Raspberry Pi

- Architecture and Hardware specifications
- Brief introduction to Linux (embedded)
- Introduction to ARM11 microcontroller
- Python – programming language
- Sensors
- GPIOs
- Different Models of Raspberry Pi
- Why Raspberry Pi.
- Peripherals of Raspberry Pi.

##### Preparing Your Raspberry Pi for First Use

- Different Operating Systems for Raspberry pi.
- Getting Started With NOOBS
- Booting for the First time.

#### Day 2 (Session 2)

##### Setting Up for a Perfect Pi Experience

- Operation Procedures.
- Do's and Don'ts.
- Updating Pi to Latest software's.
- Setting various Options and Personalizing.
- First introduction to the LINUX terminal.
- Connecting to the Network and Troubleshooting.

##### Getting Familiar with the GPIO Pins of your Pi

- Pin numbering Formats.
- The Voltage hazard Information.
- The LED Interfacing.

- General information on other pins and their functionality.
- The First Button Interface with Raspberry Pi.

#### Day 2 (Session 3)

##### Setting Up Pi to be Accessed Remotely.

- Remote Computing Basics.
- Connecting Raspberry Pi to a Remote Access Client.
- Using Raspberry Pi Remotely.

##### ✦ Hands-on session will include

- ✦ Setting up Raspberry Pi
- ✦ Flashing the loading the SD card with the OS
- ✦ Booting the OS
- ✦ Intro of items on the desktop (Debian Linux)
- ✦ Intro and hands-on coding of Python (comparison with C programming over Linux machines)
- ✦ Enabling GPIO pins
- ✦ LED interfacing using the GPIO
- ✦ Physical Email notifier
- ✦ Analog to Digital Conversions
- ✦ Using HDMI port, USB ports(mouse/keyboard), Audio jack
- ✦ Button input and LDR interfacing
- ✦ Buzzer, PIR and various sensor interfacing
- ✦ Concepts of PWM + motor control
- ✦ LCD control
- ✦ Live feed of Webcam [Web server]

#### Day 2 (Session 4)

##### Project to be Covered

- **Project 1:** Simple LED Program
- **Project 2:** LED Blinking
- **Project 3:** Traffic Light Control.
- **Project 4:** Integrating Switch & Sensing Input
- **Project 5:** Controlling LED based on Switch Input.
- **Project 6:** Integrating IR Sensor & Automated Door Opening System.
- **Project 7:** Buttons Interfacing.
- **Project 8:**Buzzer Interfacing.
- **Project 9:**UART interfacing.
- **Project 10.** Weather Monitoring System using IoT:
- **Project 11.** Smart Irrigation System using IoT:

### 8051/8052 MICRO CONTROLLER

#### OVERVIEW

This workshop mainly focuses on the students eager to learn about Embedded System using 8051. They will get a chance to expand their knowledge in the field of

designing, construction, operation and application of Embedded System with real time practical experience using 8051/8052 MICRO CONTROLLER.

#### Day 3 (Session 5)

##### Introduction to Embedded Systems

###### Basics of Embedded Systems

- History of Embedded
- Why Embedded System
- How Embedded System works
- Application of Embedded System
- Current Industrial Embedded System
- Future of Embedded System

###### Anatomy of Embedded Systems

- What are Basic Modules
- Why Need of Basic Modules
- Working Approach on Embedded System

###### Introduction of Electronic Components

- What is Electronic Component
- History of Electronic Component
- Various Electronic Component
- Application of Electronic Component
- How to use Electronic Component

###### Introduction to Sensors

- What is Sensor
- Various Basic Industrial Sensors-IR- Analog Sensor
- IR Digital Sensor
- Sound Sensor
- Selection of Sensor
- Application of Sensor
- How to Interface Sensor
- How to Design Analog/Digital Sensors

###### Introduction to Computational Devices

- What is Computational Device
- Transistor
- Logic Gates
- Microprocessor
- Microcontroller
- Difference B/W Various Computational Devices
- Application of various Computational Devices
- Selection of Computational Devices
- How to use Various Computation Devices
- Work on 8051 Family with S Series

#### Day 3 (Session 6)

##### Introduction to Programming Languages

- Various programming Languages
- Selection of programming Language
- Need of Flow Diagram
- How to write First "LED BLINKING" Code in Embedded C
- Why always First "LED BLINKING" Code
- Practice on various LED Pattern
- Debugging of Error Program

##### How to work on Educational & Engineering Level Actuator

- DC Motor
- DC Geared Motor
- Stepper Motor
- Servo Motor

##### Introduction to Interrupts

- What is interrupts
- Application of Interrupts
- Registers of Interrupts Different Modes
- Programming on AT89S52 Interrupts

#### Day 4 (Session 7)

##### Introduction to LCD Display

- Pin Description of 16x2 LCD Display
- Application of 16x2 LCD Display
- Programming of 16x2 LCD Display

##### Introduction to 7-Segment Display

- What is 7-Segment Display
- Types of 7- Segment Display
- Application of 7-Segment Display
- Programming of 7-Segment Display

##### Introduction to 4-bit Keypad and Matrix Keypad

- Use of Keypad
- How it works
- Interfacing of keypad of your application
- Programming of 4-bit Keypad and Matrix Keypad

89S51 interfacing with Session

1: PCB Express Tool

2: Seven segment display

3: LED's

4: LCD (16\*2)

5: Keypad (4\*4)

6: LCD & Keypad

7: Keypad & Serial

8: ADC (0809)

9: DC Motor

10: Stepper Motor

11: Relay

Day 4 (Session 8)

89S51 Interfacing with Modules

1. RFID Session
2. GSM Session
3. GPS Session
- 4: Zigbee Session
- 5: Finger print Session
- 6: Voice Module

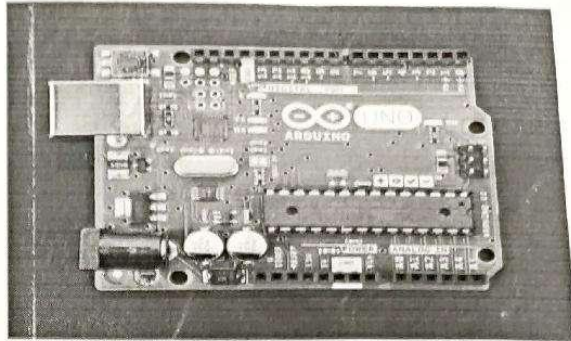
Day 5&6 (Session 9&10)

Practical Projects

#### basic project to be Covered

- RFID and Keypad based ATM security.
- Animated lcd BY LEFT
- Voting Machine
- water level indicator
- Automatic Car Parking System
- GSM and keypad based home security system
- keypad based door lock system
- RC car(wired) using 8051
- Reverse parking alarm
- Stepper Motor Speed Control via Keypad
- Temperature sensor(lm35) interfacing with 8051
- Traffic light control
- RFID BASED ATTENDANCE SYSTEM USING GSM
- pulse counter
- Android Controlled Robot using 8051 Microcontroller
- GSM based electrical Device Control.
- GPS Data Logger
- Zigbee based wireless data communication system.
- GSM & GPS based Vehicle Tracking
- RFID based time and Attendance
- LED Blinking
- Running LEDs
- Sand Glass Filling of LEDs
- Decoration LEDs/ LED Patterns Etc.
- Sensor Interfacing (DEMO)
- Displaying your Name on LCD
- Blinking Text on LCD
- Scrolling Text on LCD
- Automatic Counting of Numbers using LCD
- Seven Segment Display
- Seven Segment Multiplexing
- Matrix Keypad Interfacing
- Counting of Numbers using Matrix Keypad
- Blinking of LEDs using Timer0
- Blinking LEDs using Interrupts

## Arduino



#### What Is Arduino?

Arduino is an open source programmable circuit board that can be integrated into a wide variety of makerspace projects both simple and complex. This board contains a microcontroller which is able to be programmed to sense and control objects in the physical world.

#### Chapter 1: Arduino Hardware Basics

- What Is Arduino?
- Types Of Arduino Boards
- What Can You Do w/ Arduino?
- Arduino Uno Breakdown
- Powering The Board
- Arduino Shields
- Arduino Sensors

#### Chapter 2: Arduino Software Basics

- Arduino Programming Software IDE
- Arduino Software Breakdown

#### Chapter 3: Your First Arduino Project

- Arduino Practice Project #1

#### Chapter 4: Arduino Practice Projects

- Download The Arduino Project Code
- Connect & Configure The Arduino Uno
- Project 1 – Test The Arduino
- Project 2 – Blink An LED
- Project 3 – Pushbutton
- Project 4 – Potentiometer
- Project 5 – Fade An LED
- Project 6 – Scrolling LED
- Project 7 – Bargraph



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